When It Rains, It Pours: Multiple Malfunctions on a Pilot Trainer

by LCdr. Steve Deal

During my training to be an Instructor Pilot (IP) in the P-3C, I remember feeling utter disbelief at the wild, complex flurry of malfunctions the instructors threw at me.

These flights are legendary for FRS IPs. Prospective instructors from fleet squadrons have heard the stories and study for months, preparing for graduate-level discussions of systems and procedures. Typically, it was a 4 v 1: four instructors (two IPs and two Instructor Flight Engineers, or IFEs) against the student, who was trying to fly the plane, finish checklists, and handle simulated emergencies.

Numerous sets of on-line students and two years later, I knew the training was for real and had more purposes than I could comprehend at the time. This training saved me in countless situations.

Fast forward to the year 2000, and here I am, a fairly new department head and squadron IP in a VP squadron at NAS Whidbey Island, Wash.

One day, I began what I thought was just another pilot-training event with two students, one a PPC Fly 4, and the other a PPC Fly 2. The preflight went well. I took the pilots-around the airplane, asking detailed questions about static ports, drains and cooling ducts, peppering them with scenarios where inadequate preflights had led to in-flight malfunctions, unexpected predicaments, and emergency landings.

Engine-start checklists proceeded normally. In my scenario, I had planned a few "gray area" malfunctions on the deck, designed to make the pilot think about whether to continue the flight and the implications of that decision. One of these problems was an oil-cooler flap stuck open, which would be followed later in the flight by the simulated inability to keep oil temperature in the proper range.

As we took the off-duty, we had to taxi over the arresting gear. This is normal, and we did so at a reasonable taxi speed. I began concentrating on finishing checklists and starting the outboard engines, beginning with No. 4. As the engine came on line, we had an actual fuel-pressure-low light, meaning that either we had a fuel leak; or a defective, engine-driven, centrifugal, fuel-boost pump; or a bad pressure switch for the light (as is usually the case). The pilot stopped the aircraft and set the parking brake. I smiled again. Another real-world, typical malfunction for this team to investigate. I looked back at the IFE. I could see him reviewing the procedures, scanning instruments and ready to back up the FE in the seat for switch positioning.

As we discussed and troubleshot the malfunction, the pilot in the left seat appeared distracted, not as involved in the crew coordination as I would have liked. I took the duties of the pilot at the controls and verbalized the procedures, checked for leaks and eventually extinguished the light by cycling an electrically driven boost pump in the fuel tank, as per NATOPS. I looked at my "student" for a reaction.

"I can't move the nosewheel to the right anymore. It seems jammed," the pilot responded. "It's been this way since we ran over the arresting gear. It will move left, but not right."

I looked outside and saw the aircraft cocked a little left of centerline. I scolded myself for not noticing this while we were troubleshooting the actual malfunction. I felt concerned that the pilot didn't announce the problem earlier. Only 10 seconds passed from the time we taxied over the arresting gear to when we stopped for the fuel-pressure-low light, and the pilot was just getting ready to announce his malfunction when I announced my own.

We discussed the possibility of a jammed nosewheel-steering chain. It runs from a small steering column to the left of the pilot's seat down to pulleys, which operate actuating cylinders, powered by hydraulic system No. 1.

My first reaction was to get the No. 1 engine started and use asymmetric power to get the nosewheel to center, a systems point I had remembered from the FRS. My overriding concern was that the nosewheel was apparently working fine to the left, but not to the right.

Before we could say another word or begin to set up for engine starts, the station BASH truck whizzed by the nose of the aircraft, stopping well to the left of the flight station. Just after that registered in my mind, ground called us. "The BASH truck in front of you says you have an oil leak in your nosewheel area," the controller reported.

"Hydraulic system number one!" the pilot in the left seat exclaimed, and we all looked down at the gauge as the needle sped down to the one-gallon-left marker before we secured both systems' hydraulic pumps. I kicked myself again. Why hadn't I checked that gauge right away? Did we cause any other damage by having the pumps on so long? What was going on out there? We secured the engines, lowered the ladder, and walked out to meet the fire truck. The firefighters and some of our crew were already cleaning up the fluid spill. A large, red, oil slick surrounded the nosewheel area where we were parked. It was contained quickly, and I couldn't help but look back to the arresting gear to look for more red fluid. There was none. It was all concentrated just under our nose gear.

I walked back to the arresting gear, about 50 yards, and noticed drops of VVL-800 (lubricating fluid) all the way back from the gear to our nosewheel. The left nosewheel actuating cylinder had cracked through, leaking lubricant until the gearing inside created enough friction to move the casing apart. This action severed a hydraulic line and caused our loss of hydraulic fluid, which, at 3,000 psi, must have happened in seconds.

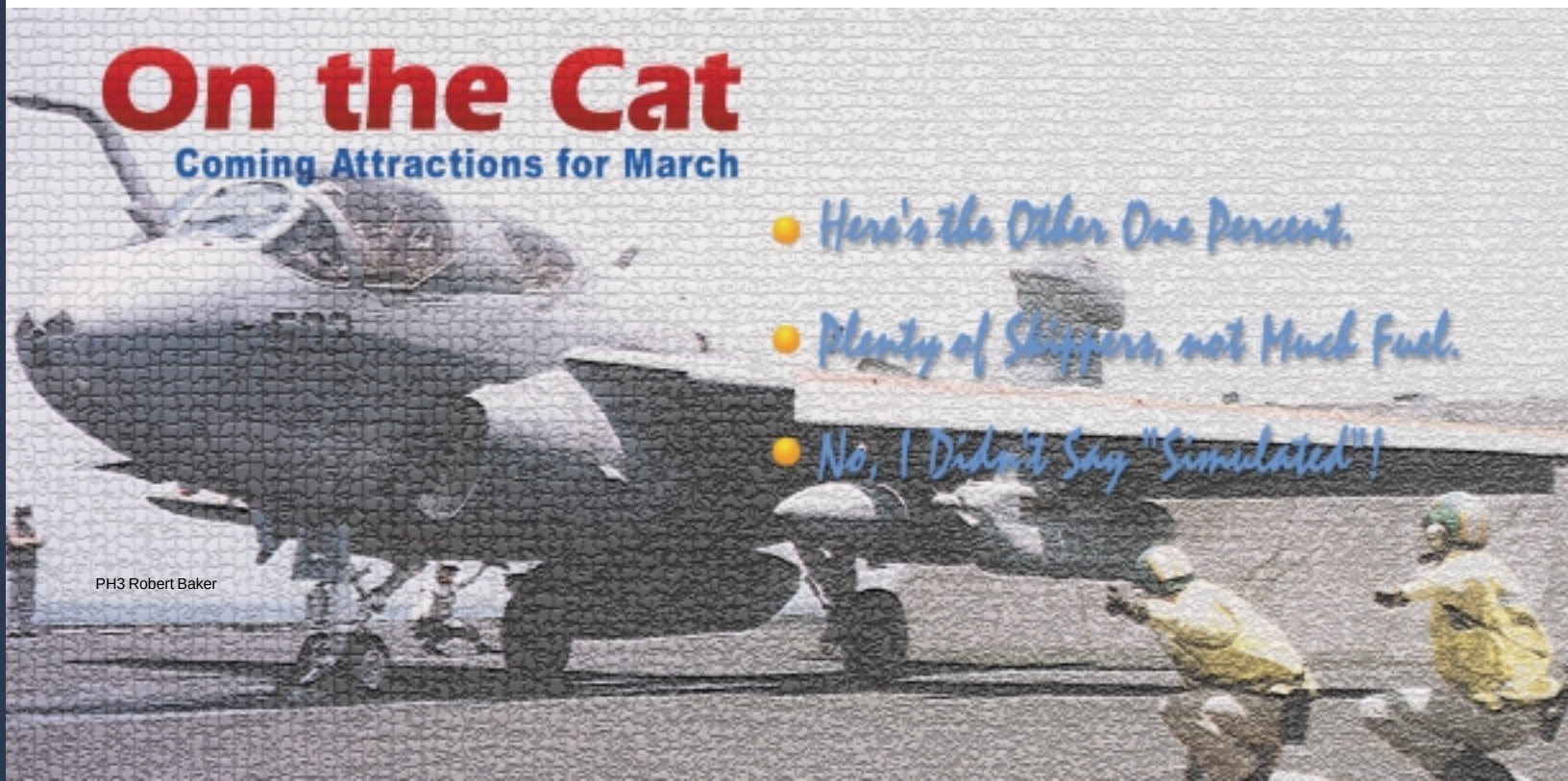
After we shut down engines on the off-duty, my IFE remarked, "Man, is this the IUT or what?" and I had to laugh and agree. I can never work too hard on my own scan while evaluating the student.

Many systems on the P-3C require constant review, and as current as I felt at the time, I could still have shaved a couple seconds off our reaction to the malfunction.

Another point is the considerable age of these systems. The P-3C is a legacy aircraft with many modifications, which complicate maintenance as well as aircrew troubleshooting procedures. I have never before seen aluminum shear because of vibration and stress under normal operating conditions, and this was a wake-up call for me.

Seasoned pilots in the left seat, no matter how qualified, need and deserve the best copilot backup possible. Good defensive positioning by the IP and a constant scan are not demeaning to the student—they are skills necessary for operating a complex aircraft.

LCdr. Deal flies with VP-1



PH3 Robert Baker